⣿ RDS/RBDS ⣿

A Summary Of Data Broadcasting Technologies and Potential Applications In Today's Market

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A Summary Of Data Broadcasting
Technologies and Potential Applications In Today's Market

by

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Article Description

Part 1 of the following article provides a brief introduction to the options that are available today for distributing information using data broadcasting technologies. Part 2 is designed to help stimulate thought of possible uses and applications of new services based on data broadcasting technology. The article discusses how this technology may relate to the development and distribution of electronic newspapers, magazines, and possibly even new types of information services not yet developed. It also discusses how a possible uniting of resources of print media with radio and TV data broadcast technologies could provide new opportunities for both the broadcasting and journalism industries. Potential opportunities for radio and TV stations for providing multimedia information services are also discussed.

PART 1 - Data Broadcasting Methods

Introduction

Are you planning a communications system where you need to distribute information to a large number of remote sites? Do you presently have difficulty trying to get data to a large number of branch locations? Or do you need a better way to provide large amounts of vital information to hundreds of your subscribers?

If your answer to any of these questions is "YES!", then keep reading! If you need to provide data to a large number of remote locations, you should consider one of today's data broadcasting options. Data broadcasting is a general term that typically describes a point to multi-point communications system. Options are available today for distributing data to remote sites locally or globally. By remote sites, we usually mean a location some distance away (several miles to several thousand miles) from a central location, such as a company's headquarters. While data broadcasting is not a new technology, new applications and new methods of implementing these systems are being developed today that make it easier and more cost effective for companies to utilize data broadcasting technologies. In this brief article, we will summarize the advantages of data broadcasting over conventional methods and identify some of the options available.

Advantages of Data Broadcasting Applications

Regardless of the method of implementation, virtually all data broadcasting applications have some advantages in common. All locations typically receive the transmitted data at the same time. Information management is much easier for network operators, because the data can be transmitted to all sites simultaneously. This system is ideal for time sensitive data which must be delivered quickly and updated often. Users of the system can have the data piped right to their desktop PC, and do not have to take any extra steps to retrieve the data (such as dialing out to a central server). Data broadcasting systems are ideal methods for distributing data when working in areas with poor phone lines or no phone lines, since phone lines are not even utilized. In most cases, at least for satellite based systems, the cost of the "air time" is typically a fixed rate which is based on the data rate required, not on the number of sites. This means that as a network grows in terms of the number of sites, the only incremental cost related to the communications system is the cost of the receiving equipment at each site. As a result, data broadcasting systems often provide the most cost effective method for reaching a large number of users.

Data Broadcast Methods Summary

Direct Broadcast Satellite (DBS) Services

DBS services can cover the entire continental U.S. and often several countries at one time. Services are available to Europe, Mexico, and indeed much of the globe. DBS carriers can provide the capability to reach multiple countries simultaneously by using different satellites. Commonly available transmission speeds range from 1200 baud to 2 Megabits/sec and beyond. Satellites typically provide very reliable data links with very low error rates. Small satellite dishes can often be used which are one meter or less in diameter. Hardware for use in these applications is commonly available and can be purchased for relatively low cost, depending on baud rate and features desired. DBS services are ideal when a large number of sites is spread over a very wide geographic area. Satellites in orbit today typically require a

fixed dish for reception and are not well suited for reaching mobile users. Often a hybrid network is set up with satellites providing the wide area backbone, and local FM or microwave transmitters are used to reach mobile users or hand held devices.

FM Subcarriers

Your local FM radio station may be willing to transmit data over an FM subcarrier. Often these subcarriers are used to provide background music, or second language services. These subcarriers can also be used to transmit data. Data rates up to 9600 baud are commonly achieved. FM subcarriers are ideal for transmitting data in large metropolitan areas. One advantage of FM subcarriers is that only a small antenna is required and it is possible to reach mobile users. Radio stations may be willing to lease unused air time for data services at a relatively low cost, depending on your area and the demand for these services. FM subcarrier data receivers are available from several manufacturers that can be interfaced to a PC via the serial port.

RDS or RBDS (Radio Data System or Radio Broadcast Data System)

This is a relatively new technology in the U.S., and is referred to most commonly as RDS. An RDS system allows FM radio stations to transmit text based information to RDS capable radio receivers. Information such as call letters, program format, and "radio text" messages can be received and displayed on RDS receivers. The "radio text" feature of RDS permits the display of short messages, such as song titles and artist information, or advertising messages on RDS FM receivers.

It is also possible to transmit binary data within the RDS data stream by using the TDC (Transparent Data Channels). While the baud rate is slow, (under 200 baud) for a typical TDC application, it is of interest because the capability lies within the RDS standard to use this capability. In other words, an RDS station often has this capability, whether they choose to use it or not. Consequently, many stations are interested in finding data applications that can take advantage of this untapped resource. The TDC channel can be used to transfer small binary files, or other binary data. Even at the low baud rates available, it is still possible to send one to two megabytes of data each day through an RDS data network. To be useful, an RDS data receiver must be used to pick up this information, and can be used to route it to the serial port of a PC.

VBI (Vertical Blanking Interval)

The capability has been available for years to transmit data within the VBI (Vertical Blanking Interval) of an analog TV signal. The VBI is the black stripe you see when the vertical hold of your TV set needs adjustment. It is possible to transmit data at rates of at least 38400 baud on some VBI systems. To transmit VBI information requires a rather expensive encoder at the head end of the system to insert the data into the TV signal. Data sent via VBI travels anywhere the TV signal does, such as through satellites and cable TV systems.

NOTE: Some cable TV systems may strip out the data contained in the VBI portion of the signal. You should consult the cable system operator before distributing data through the cable network using VBI.)

TV Subcarriers

The technology is available today for TV stations to transmit TV via subcarriers. The technology is similar to that of FM subcarriers described earlier. TV stations actually have several options available for transmitting data via subcarriers. This option is seldom exercised. As such, TV stations hold one of the last untapped resources of bandwidth for transmitting data in a local area.

Future Trends

Data Transmission In Active Video

One company has pioneered the capability to broadcast data within the active portion of an analog video signal at speeds today of 384 kbit/sec. They do not use VBI. As of this writing the system is still under development, but holds potential for the future.

Compressed Digital Video Using MPEG2

The capability lies within the MPEG2 specification to transmit an auxiliary data stream. MPEG2 compliant equipment should support the capability to permit the transfer of binary data not related to the video stream. This will allow broadcasters of digital video to provide adjunct data broadcast services.

Paging Systems

While it may not be in widespread use yet, the technology is now available to transfer binary files via one way paging networks. The most practical application is perhaps to reach mobile users equipped with laptop PCs and wireless modems/paging receivers. Data rates for paging are still typically very low and the transfer of large files that may approach a megabyte or more is not feasible as of this writing.

Terrestrial Cable Systems

While not a data broadcast technology by itself, it is important to realize the potential of this existing infrastructure. It is possible today to broadcast data through terrestrial cable systems. Future data applications will likely be taking advantage of this existing infrastructure to reach home audiences in particular. A few modems for use with cable systems are already available or in the final stages of development.

Example Applications - Summary

Data broadcasting can be used in a variety of applications. Because it is possible to transfer video and audio as compressed binary files, it is even possible to deliver data for multimedia applications using data broadcasting applications. Below is a list of example applications where this technology can be easily applied:

- financial information
- electronic newspapers
- trading networks

- advertising kiosks
- software distribution
- shopping networks
- electronic catalogs
- multimedia networks
- trading networks
- ad distribution
- programming of signs
- distance learning applications

Hardware and Software - Off The Shelf Solutions

Off the shelf hardware has been widely available for implementing data broadcasting applications for many years. And now, off the shelf software is available as well. Milestone Technologies Inc. has introduced SATX, a data broadcasting file transfer program. SATX provides a reliable method for transferring binary data files over one data broadcasting networks. SATX can be employed in virtually any one way (simplex or broadcast only) data link, such as those described in this article. Customization of SATX for particular applications is available. SATX takes care of the details of the communications aspect of the application, leaving the developer free to concentrate on the specific application at hand. If you would like more information on SATX, simply call or write for details. Contact information is at the end of this article.

PART 2 - Data Broadcasting Applications

Radio and TV Stations - Searching For Customers To Utilize Their Subcarriers

Radio stations and TV stations have recently become more aware of the capabilities and potential marketing advantages of providing data broadcast services through the use of their subcarrier capabilities. In fact, many stations are eager to provide data services, but simply do not know how to find customers that may be interested in utilizing their data services. To further complicate matters, many stations may not have the expertise to assemble a complete data broadcast network, which includes both the hardware and software required. Nonetheless, many are eager to participate in their own way in the information highway, which has been so well publicized by the media. Perhaps the primary reason that the data broadcasting technologies of radio and TV stations have not been utilized is because corporate America is not generally aware of these capabilities. Part of the goal of this article is to help potential data customers become aware of these services and capabilities.

Radio and TV Stations - Programming News, Music, and Advertisements Via Satellite

With the advent of the digital age and its transformation of the radio and TV industry, the capability is now present to deliver information digitally via satellite to all subscribers of a service simultaneously. Advertisements can be delivered via satellite to radio and TV stations in the form of compressed digital audio files. It is now even possible to deliver new music releases digitally to radio stations. The digital files could be stored and played back at will. News services could digitize audio clips for playback by stations with digital capabilities. The

SATX data broadcasting software described elsewhere in this article can deliver even large digital files reliably, and could serve as the core software of such a service. The technology is also available to provide addressability, remote turn on/off of a particular site, and to allow multiple services to be distributed through a single satellite channel with only those authorized to receive it being permitted to retrieve the information from the data feed.

Newspapers, Magazines, and New Services and Methods of Delivery

The time may have come for newspapers, magazines, and news services to consider the advantages and potential market for development of new services based on data broadcasting technologies. This service could take on a variety of forms, not simply limited to the delivery of news electronically. There is potential for the development of services for both businesses and the home PC user. Radio and TV stations could consider providing local news to area BBS operators, including photos as GIF files and possibly even audio or video clips of recent dramatic events. Low cost FM subcarrier data receivers have made it practical for home users to receive information right at their desktop. Home PC users might enjoy the capability to look at a map of the latest traffic jams on their PC just before leaving for work. In the winter, a complete list of all closings and cancellations could appear on the PC at the click of a mouse. And all of this could be delivered to home PC users with an FM data receiver, which costs about the same as a high quality modem. Visually impaired individuals have the capability to utilize low cost speech synthesizers installed in their PCs to literally read to them. It is conceivable that this technology could be adapted to provide a valuable service to the common busy person, who simply wants to be able to click on an item and have the PC read to them while he or she gets ready for work, or performs other tasks. This might be an alternative way to provide information to users through the PC without requiring the eye strain of reading on screen.

One significant advantage of services delivered via subcarrier is that they do not tie up a phone line. In households where a family member may spend an ever increasing amount of time on line, the ability to receive information without dialing out to get it could be an important advantage. Mobile laptop users are becoming familiar with the concept of receiving news and other vital information through a wireless network. These users should easily adapt to the concept of receiving information via a data receiver attached to their PC. The concept of receiving information relevant to the local area may be well received today, especially in large metropolitan areas. And it provides an opportunity for local information providers that cannot be easily served by nationwide information services.

It would probably help to illustrate a few more examples of possible new services based on local data broadcasting networks. Newspapers already collect information on real estate listings, automobiles, auctions, construction equipment, office equipment, and so forth. Imagine the power and flexibility of having this type of information in electronic form and broadcast to realtors, car dealers, businesses, and others who may want daily updates in an easily searchable form. In fact, it is possible to set up a variety of information services in many different categories, and let the subscribers only choose the ones which interest them. Addressability in the data broadcast software will allow the newspaper to deliver messages to a specific subscriber, turn off a particular subscriber's service, and to even add additional services if the subscriber requests them. Some of this information would be useful to individual consumers as well.

Advertising Possibilities

In some cases, the cost for such networks should not be born by the subscribers alone. There is room for creative development of advertising to be included in some local information services, provided that it also serves a useful purpose for the consumer. Perhaps a list of specials, electronic coupons which have been downloaded, or special incentives provided only to subscribers of the service would be a small part of the information provided. Advertising in a consumer oriented data broadcast information service would need to provide valuable and desired information. While this is a challenge, it is an achievable goal.

The Multimedia Opportunity For Radio and TV Stations

Multimedia kiosks in various forms are springing up in cities across the United States. In some situations, hundreds or in some cases, thousands of kiosks may be placed in one city. These kiosks are often PC based and execute software that provides information which must be updated. Some kiosks providers are still manually traveling to each site, or physically dialing into each kiosk PC to upload new information. Data broadcasting provides an ideal means for kiosks network operators to distribute data. And in local regions, this can be carried out using the services of a local radio or TV station. A national service may eventually adopt DBS services, but in the early phases of a kiosk deployment plan, it is simply not cost effective.

Educational Opportunities - For Schools, Universities and Technical Colleges

Universities, technical colleges, and even public schools could set up networks to provide data and information to students who are currently attending. Updated class schedules, and even class materials could be distributed to students via data broadcast networks. The university or school paper could even be distributed to students in electronic form, often using the FM subcarrier capabilities of the local campus radio station. Such a tool would not only help to distribute information, but help to educate tomorrow's leaders about the capabilities of these technologies.

Matching Broadcasters and Information Providers - Here's How!

Milestone Technologies Inc. often receives requests from radio and TV stations who are interested in data applications, but do not have data customers lined up. MTI is willing to help match those with potential applications to broadcasters who have an interest in providing a data service. If you are an application developer or information provider, and would like to find a radio or TV station to work with you on your project, please let MTI know. Similarly, radio and TV stations should feel free to contact MTI to put their names on the list of stations who are interested in providing data broadcast services. MTI will keep those requests on file and match up requests appropriately when possible.

Milestone Technologies Inc. - Data Broadcasting Hardware and Services Vendor List

MTI has developed cooperative working relationships with a variety of hardware vendors, satellite carriers and other vendors who provide complementary products and services relating to data broadcasting. If your company provides these services, and you have not yet

contacted MTI to let us know of your products and services as they relate to data broadcasting technology, please do so!

Data Broadcasting Consulting Services

If you need help setting up your data broadcasting applications, have questions about data broadcasting technologies, or our SATX data broadcasting file transfer software, please contact Milestone Technologies Inc. for assistance. We can help you design your network, make hardware recommendations, provide customized communications software and even put you in contact with carriers for your network. We can also help you develop low cost demos to test and evaluate various concepts.

For more information about data broadcasting technologies or SATX data broadcasting software, please contact us.

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Last modifed 23 August 1995

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RDS/RBDS

Radio Data System
by David Hemingway

Introduction

The Radio Data System (RDS) provides a method of sending extra information along with VHF/FM radio services to suitable receiving equipment without affecting the normal audio programme.

The information is supplied by the broadcasters themselves. The various types of information, along with suggestions for possible use are contained in the EBU Specification for the system. One purpose of the system is to give the listener more information about the particular station to which the receiver is tuned.

Services Offered by RDS

The services listed in the EBU Specification are divided into three categories:

- Primary features, considered essential in any RDS receiver.
- Secondary features, considered desirable in a receiver.
- Additional features that are essentially unrelated to the audio programme.

Primary Features

1. Programme Identification (PI):

This would enable a suitable receiver to search for the best signal carrying a programme with this identification.

The code contains information about:

a. country

b. coverage (eg. National, Local)

c. programme reference number

2. Programme Service Name (PS):

A receiver could display the name of the service being received, using up to 8 characters.

e.g. "BBC 4 FM" , "BBC H&W ", "BBC Scot".

3. Alternative Frequencies (AF):

A list of up to 25 frequency channels carrying the same programme could be included. Receivers with a memory facility would then search for a better signal more quickly.

4a. Travel Programme Identification (TP):

This is an on/off signal to indicate that this is a programme on which announcements are usually made for motorists.

4b. Travel Announcement Identification (TA):

This is an on/off signal which indicates that an announcement for motorists is actually being transmitted. It could be used to de-mute the receiver or to switch from cassette replay for the duration of the announcement.

Secondary Features

1. Programme Type (PTY):

A code is transmitted which defines the type of programme material eg. current affairs, drama, education. A receiver could then be programmed to search for a particular type of programme.

2. Decoder Information (DI):

This information states the mode used by the transmission eg. stereo, mono, binaural, compressed.

3. Programme Item Number (PIN):

This code, using scheduled programme times and dates, would uniquely identify any programme on a network, and could be used to enable suitably equipped receivers to respond to pre-selected items.

4a. Other Networks (ON):

Information about 8 other networks can be transmitted. This includes up to 25 AF's for each, TP and TA, PTY and PIN.

4b. Enhanced Other Networks (EON):

Broadcasters soon found that the information that could be conveyed by the ON feature was too limited to be of much use. For example the BBC wanted to be able to cross-reference not only the other Networks, but also National Regional and English Local Radio services.

EON enables information on up to 25 other networks to be sent, including not only those features available via ON, but also PS as well. It should be noted that ON and EON are not compatible and should not be mixed within the same broadcast.

5. Music/Speech Switch (M/S):